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RECUMBENT & TANDEM RIDER

M A G A Z I N E



Reviews: TriSled Rotovelo
AZUB Origami ■ Catrike Expedition
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AZUB Origami



By Brian Zupke

Recumbent bicycles may be more comfortable to ride than diamond frames, but that comfort comes at a price. It takes a long bike frame to support a reclined rider. That additional length may not be a problem while riding the bike, but storing and transporting recumbents can be a right pain. Over the years, recumbent manufacturers have attempted to address the issue in a variety of ways, most of which involved designing their bikes to be easy to disassemble or to fold up. Unfortunately, often their efforts to design in convenience have introduced compromises in performance or rider comfort. Then along came AZUB and their new Origami folding recumbent. They are one of the few manufacturers who've hit a home run when it comes to combining portability, storability and ridability.

The Origami's wheels are the same size, and its bottom bracket extends out in front of the front wheel. The Origami's monotube frame slopes dramatically upward as it runs from the chainstays (two smaller tubes that hold the back wheel) to the front fork,

where it levels out to keep the pedals at a reasonable height. The length of the boom tube can be lengthened or shortened to adjust for different-sized riders. To do so, two quick-release bolts in front of the steering are loosened, then the boom tube slides in or out to lengthen or shorten the frame.

The frame and fabricated components all appear to be well-constructed and very well-engineered. I was impressed at how easy it was to fold or adjust of the Origami. Even though I didn't have a user manual, it didn't take long at all to figure out how to adjust the bike to fit me or to fold it for transport.

The Origami is available in several different colors: orange-yellow, blue, red, green, olive green, beige, black, white, pink and yellow. AZUB also allows you to mix it up and choose the color and finish (matte or glossy) of each frame component separately; the back of the main frame (behind the hinge), the front of the main frame, the front boom, handlebars, seat, and seat stay. Some of the third-party components are available in different colors as well. You want a bike that's part red, part blue, and has a little bit of yellow? Not a problem. AZUB's flexibility

allows you to come up with some pretty striking designs.

The Origami is equipped with two 20" (406) wheels, which means replacement wheels and tubes are easy to find, and that you only have to carry one size of spare tube. The front wheel is secured with a quick-release skewer so it can be easily removed to fix a flat or to secure the bike for transport (if you are not folding it). The test bike was configured with the Shimano Alfine 8-speed internal rear hub (with planetary gearing), which means the rear wheel is secured with nuts, and you have to use a wrench to remove it. (A skinny wrench works best because the bracket that keeps the bike in the folded position restricts access to the nut.) The Schwalbe Marathon Racer tires have some tread for traction but also provide low-rolling resistance.

The test bike was equipped with front and rear Shimano Tektro V-Brakes. Each brake is controlled by a separate brake lever. Hard braking takes a little more effort with V-Brakes than it does with disc brakes, but I was still able to apply substantial braking power with a single finger. I could apply

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enough force to lock up the rear wheel (but not the front). The brakes are very effective. AZUB also offers the Shimano XT V-Brakes for an additional cost. Disc brakes are not an option on the Origami, but I don't consider that a huge loss.

The bottom bracket is slightly higher than the seat bottom, and the pedals are above and in front of the front wheel. If you are new to recumbents, the height of the pedals can be intimidating at first, but after a couple of hours of riding, you'll hardly notice the position. You have to be a little careful on very sharp turns to keep your heel from touching the front wheel. I found that slightly rotating my foot away from the bike pretty well takes care of the problem. However, the few times I did touch, I simply moved my heel out of the way.

The test Origami came with folding pedals. They are a bit thicker than normal pedals, but that didn't make a difference when riding. To fold the pedals, simply push them towards the crank arm, then rotate them 90 degrees. If you plan on using clipless pedals and will be folding your bike frequently, you may want to remove the pedals to get a more-compact bundle, but it shouldn't be necessary.

The top portion of the chain has pretty much a straight shot from the chainring to the rear wheel. That means no pulley is required to guide the chain, and no energy is lost due to drag. The top and bottom portions of the chain are encased in plastic tubing, which is secured to the frame in two places: near the front wheel and below the seat. The secured tubing eliminates chain tattoos, keeps the chain from tangling

when the bike is folded, and ensures the chain doesn't bounce all over the place when riding on bumpy terrain.

There are a large number of gearing options for the AZUB Origami, so you should be able to find a configuration that's optimal for your riding style, environment, and budget. The test bike was equipped with the 8-speed Shimano Alfine 8 internal hub and it performed well, though when I was shifting under load, sometimes I had to ease up on the pedals. An advantage of the internal hub is that it takes minimal maintenance, and it simplifies folding the bike. (There are fewer moving parts that may get bent or damaged if the folded bike is dropped or is not fully secured during transport.) Even though the internal hub does not require a derailleur, the bike was equipped with one which acts as a chain tensioner to accommodate different-sized riders without having to lengthen or shorten the chain.

The test bike's gearing was low enough for the steep hills in my area. I could maintain a pedal speed of 60 RPM while going just under four miles per hour. On the steeper climbs, I could maintain speeds as low as two and a half miles per hour without having to mash the pedals and without difficulty maintaining my balance. At that low a speed, I had to make frequent steering corrections, but I didn't have to devote much of my attention to the task. Instead, I could still enjoy my surroundings, and even chat with the senior citizens who were passing me as they walked up the hill. Did I mention that I'm out of shape? At least, I beat the lady with the walker. (Well, okay, it was a tie.)

AZUB Origami Specs

BB Height	26.25"
Boom Tube	Cro-Moly
Brake Levers	Tektro
Brakes	Tektro V-Brakes
Chain	KMC
Chain tensioner	SRAM
Color	Customized options
Crankset	Shimano Alfine, 170mm cranks
Fork	AZUB
Frame	Tig-welded aluminum
Handlebar	15.75" wide
Hubs (f/r)	AZUB/Shimano Alfine 8-speed
MSRP	\$2,345
Overall Height	43.5"
Overall Length	73"
Pedals	Folding
Rims	Remer 406-19
Seat Back Angle	20-50 degrees
Seat Const.	Composite w/2.25" foam padding
Seat Height	25"
Seat Width	3 Available Options
Shifters	Shimano Alfine
Spokes	36/36, stainless, straight-gage
Tires	Schwalbe Marathon Racer 2-x1.50, 85 psi
Weight	38.5 lbs
Weight Range	100 kb max
Wheel Base	46.75"

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While I had plenty of low gears for climbing, I ran out of high gears too quickly on level ground. By the time I got to cruising at 15 miles per hour, I was already in the highest gear. If I pedaled as fast as I could, I was able to sustain a maximum speed of about 25 miles per hour. For the type of riding I do, if I were going to keep this bike, I would either add a front derailleur or the Schlumpf Speed-drive crankset, both of which are offered by AZUB as options. That would allow me to pedal at higher speeds while still having plenty of low gears for climbing steep hills. If you don't care about going fast (except coasting downhill), then the 8-speed configuration should work fine. Alternatives to the Alfine 8 include the Shimano Alivio, Deore, and XT groupsets, as well as the Shimano Alfine 11-speed internal hub, or the Rohloff 14-speed internal hub.

The 8-speed Alfine internal hub is controlled by a combination of a thumb-shifter (to shift up), and a second lever operated with the index finger (to downshift). The shifters are on the right handlebar. Shifting down is quick and easy; up-shifting is also easy, but requires a greater amount of travel and a bit more force. One of the great things about some internal hubs is that you can shift to a lower gear without having to pedal. This comes in handy if you have to make an abrupt stop and don't have time to downshift.

The Origami's handlebars are welded to the steering tube, and they slope downward like a flattened upside-down "V." The steering tube slopes back toward the rider, which could have made getting on and off the bike difficult, however, AZUB did something pretty cool to make sure it didn't. They put an adjustable hinge where the steering tube connects to the headset. This allows the rider to push the handlebars forward and out of the way for mounting and dismounting, and also allows the rider to pull the handlebars



closer or push them further away while riding. Do you fancy stretching your arms without slowing down or taking your hands off the bars? Just push the handlebars forward, and you can find a new comfortable position. Want to pretend you're a big, bad, biker dude, riding the Harley of your dreams? Just push the handlebars forward, and make vroom-vroom noises and you're ready to go.

The hinged steering tube does mean, however, that you have to be a little careful when you walk the bike, because it makes the bike easy to tip. It wasn't too difficult to push the bike using just one handle, but if you use both hands, it's easier to control.

The Origami's handlebars are welded to the steering tube, so their angle and fore/aft position (in relation to the steering tube) cannot be adjusted. However, the length of the steering tube is adjustable, and the steering tube's hinged connection allows you

Typical of AZUB recumbents, the Origami's seat is very comfortable and height adjustable.

to change its angle. So it's pretty easy to find a position that is comfortable for your hands and arms while maintaining the necessary clearances for riding. The steering mechanism overall is so versatile that I didn't find the fixed handlebar positions to be a problem.

Since the Origami's steering tube slants toward the rider, depending on how you adjust the steering tube angle and length, and your seat position, you may experience some "tiller effect." (That's when you make a turn and the handlebars swing out to the side. In extreme cases, the handlebar closest to the rider can hit his or her chest, or the handlebar furthest way can move out of reach.) While I didn't find the tiller effect bothersome on the Origami, some people may not like it.

There is plenty of room on the Origami's handlebars to attach a computer, GPS, or smart phone. Due to the Origami's handlebar configuration, the rider's hands end up in a "praying mantis" position. This was comfortable for me, and it didn't take much effort to keep my hands on the bars. The bike wanted to go straight; when I rode with relaxed arms and my hands just resting on the bars, the bike stayed fairly centered. Riding with a single hand on the bars took a little more effort, as just resting my hand on it caused the bike to want to turn.

The Origami has a fairly large seat that is a metal shell topped with a foam cushion. It's shaped kind of like a skateboard with slight

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Above and below: The Origami's handlebars and controls were a fine fit for our tester. Handlebar height is adjustable, as is the fore/aft positioning. Bar tilts full-forward to ease mounting and dismounting the bike.



kicktails on each end. The cushion is held in place with straps and Velcro, and is quite secure. AZUB also offers small and medium sized seats, so all you tiny-butted riders can pick the size that's right for you.

The Origami's seat configuration defines the term "adjustability." The seat bottom is secured to the frame by a sliding bracket that is attached to the monotube and held

in place with two quick-release levers. The bracket can be adjusted forward and backward about six inches. The seatback rests on a telescoping tube that is welded to the seat stays. The telescoping tube can be lengthened or shortened (by about six inches) to raise or lower the seatback. The seat stays pivot forward and backward on their connection point to the chainstays, in

order to allow the telescoping tube to change length. Additionally, the connection points that attach the seat to the bracket and to the telescoping tube both pivot, providing an even wider range of seat angles. That makes for a total of five different places you can adjust to make the Origami's seat fit you. This bike is amazingly configurable.

Overall, I found the seat to be very comfortable, even on long rides. Some recumbents I've ridden have seats that I tend to slide forward on, and then I have to push myself back into the proper position. This was not the case on the Origami; its seat kept my tuckus planted in the correct spot.

An optional headrest can be added to the seat. (The test bike didn't have one and I missed it.) Since the seat base is a composite shell, you can drill holes in it to bolt on gear. The test bike had a gear bag bolted to the seatback that had a built-in water bottle slot, so I didn't need to add any water bottle cages. If you don't get that bag, you can bolt water bottle cages to each side of the seatback, giving you easy access to water while you ride.

One of the key features of the Origami is its ability to fold (hence the name). In the middle of the monotube is a hinge secured with a locking pin. The locking pin has several fail-safes built into it to prevent the bike from randomly folding while you're riding it. In order for the hinge to bend, first a quick-release lever connected to the pin needs to be loosened, then the lever must be rotated 90 degrees and lowered, allowing the locking pin to disengage. Additionally, since the seat is connected to both halves of the monotube, it must be removed in order for the bike to fold. To remove the seat, simply loosen the

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top quick-release skewer that hold the bottom of the seat, and loosen the quick-release on the seatback. Then you can pull the seat off. (If you mark the telescoping tube position and seat bottom bracket position before you take the seat off, it will be easy to readjust the seat when you put it back together.)

Once the seat has been removed and the hinge's locking pin is released, turn the front wheel 180 degrees, and fold the frame in half. A special cap on the end of the front axle will fit into a bracket that's on the right end of the rear axle. Then you fold the steering tube down flush with the frame, and secure it with the attached Velcro strap. Once the steering tube is secured, the entire folded package is a solid mass, making it easy to lift, carry and stow. AZUB also offers a bag you can use to carry the folded Origami. If you plan to fold the bike often, the bag would probably be a good idea.

This bike really is easy to fold. One of the coolest things about the process is that you won't get grease everywhere because the chain is encased in the plastic tubing. It simply folds right up along with the frame. And the whole process only takes a few minutes. I'm sure that with practice I could do it even faster.

As a test, I wanted to see if I could fit the folded Origami inside my Honda Civic 4-door sedan. The folded bike fit in the trunk with relative ease. (I was extra careful not to bang up the accessories I had mounted on the bike's handlebars.) Getting it into the back seat was even easier. That's pretty amazing, considering that the bike is over six feet long when unfolded.

If you want to fold the Origami into an even smaller package, shorten the boom tube before you fold it (make sure to mark the tube first so you can easily slide the tube back to the desired length when you unfold the bike). Additionally, make sure the pedals are in a vertical position so they don't stick out and make the bike longer. Once the bike has been



The dual quick releases on the left allow for adjusting the seat. The single QR on the right allows the Origami's frame to be quickly and easily folded for storage or travel. Multi-step unlocking process guards against accidental release.

folded, you can't move the pedals without removing the chain.

Now we get to the fun part of the review – how does the Origami ride? In a nutshell – it was awesome.

I rode the Origami to the top of my favorite hill and headed back down. With the tires at full pressure, I topped out at 52 miles per hour. At that speed, the bike was very stable. I was impressed. I had anticipated the pivoting handlebars might give the bike a "wobbly" feel, but both during my normal riding and when I was screaming down the hill, the Origami was solid. There are a few bumps on that hill that can mess with your control if you hit them at high speeds. The Origami handled them with ease. It seemed to be almost self-correcting – it really wanted to go straight down the hill. Just to have a little fun, I tried some slalom-like turns and could easily maintain a nice rhythm. (Yes, Mom. I watched out for cars.)

The Origami doesn't have any suspension, but it does have a large, well-padded seat. Also, the frame seems to have a little flex to it that helps dampen bumps. You could lower your tire pressure if you wanted to soften your ride further, but that would increase drag and you'd have to work harder to get where you want to go. Not once during my test rides did I wish the bike had more suspension.

The Origami's rear rack has room for panniers, but you can't mount a trunk on it. Also, AZUB offers an under-seat bag that is specifically designed for the Origami. It is secured to the back of the seat shell by several quick-release straps and stabilized by

a Velcro strap that attaches it to the pannier rack. The bag is big enough to carry quite a bit of gear. It can easily hold everything you need to maintain your bike while on the road, including a spare tire (if you get one that can be folded), and the bag used to carry the folded bike. There's also a flat pouch with a clear plastic window that is Velcroed to the right side of the under-seat bag. It's great for providing easy-to-access, water resistant storage for a map or route sheet.

You should be able to hook any trailer to the Origami that connects to the axle on the left side. (The right side of the axle has the bracket for securing the front wheel when you fold the bike.) Bike hitch mounts that rely on the seat stay/chainstay triangle will not work on the Origami because its chainstays are larger than normal, and the built-in pannier rack will prevent the hitch clamp from fitting properly.



Out test Origami was fitted with an 8-speed Shimano Alfine internally-geared hub. Chain tensioner can be seen on the right side of the wheel assembly. Other multi-gear hubs, such as the popular and reliable 14-speed Rohloff Speedhub 400/14 can also be fitted when ordering a new Origami.

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AZUB offers a double-leg kickstand for the Origami, and I love it. Most bikes I've tested have single-leg kickstands and are prone to tipping over, especially if they're loaded with any gear. The Origami's double-leg kickstand keeps it vertical, even if it's heavily loaded. The kickstand's two legs have adjustable feet that can be lengthened or shortened.

Several of my family members have disabilities, and it affects what I look for when I review bicycles and trikes. I was pleased to see that AZUB offers a number of accessories for riders with disabilities. Some of the options offered include shifters and brake levers you can work with one hand, support boots for pedals (to keep a rider's legs in a fixed plane), and a parking brake for their trikes.

AZUB has quite a few more great accessories for the Origami. If you plan on doing much night riding, I highly recommend adding the SON Dynohub because it's so nice not to have to worry about your headlight not working because of dead batteries. While the Origami I tested didn't have the hub, I've ridden another AZUB recumbent that was so equipped. While the hub added a little drag, it wasn't significant. Also, as I hate picking road grit out of my teeth, I recommend mud guards




Above left: The bike's boom tube is easily adjustable. Our test unit was equipped with a rear derailleur spring setup, allowing boom-length adjustments without the need to add or remove chain links.

Above right: Under-seat pack provides room for all the gear needed for recreational rides, features water bottle pockets on the sides. Seat angle is adjusted via the blue and black tube lengths.

if you're going to ride in the wet. AZUB's website shows a lot more accessories (plus some other great bikes and trikes) but I don't recommend spending much time browsing there unless your wife is a whole lot nicer than mine. You'll just get your hopes up.

Clearly, AZUB put many engineering hours into the Origami. It adjusts to fit darn near anybody, rides like a dream, and folds up almost small enough to fit in your back pocket. It's comfortable enough that the only muscles you'll strain on long rides are those

that you pushed too hard and the ones you use for smiling. You can even customize its color palette to suit whatever tickles your fancy. I'm trying to come up with something I don't like about the Origami and the only thing I can think of is that I don't have one in my garage. I'll tell you this, when my wife finally decides to leave me for someone who's sensible, I'm going to replace her with a woman who has lots of money she wants to spend on bicycles. Hmmm, or someone who has an in at AZUB. That would work, too. 

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